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SYNTHESIS AND RESEARCH OF PHOTOCURABLE PROTECTIVE COATINGS ON THE BASIS OF OLYGOESTERACRYLATES VARIOUS BUILDINGS

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Abstract. Currently, photoinitiated polymerization is really important, this is due to the fact that the field of application of photocurable materials is increasing. This method of curing is used in the manufacture of varnishes, paints, adhesives, coatings, in stereolithography, 3D printing, dentistry, laser image printing, microelectronics [1].

Polymeric binders were obtained on the basis of acrylic monomers by mixing at a certain ratio of polyethylene glycol dimethacrylate and triethylene glycol dimethacrylate ether, polyethylene glycol dimethacrylate 400 and oligourethane dimethacrylate, polyethylene glycol dimethacrylate-400 and pentaerythritol tetraacrylate. To initiate polymerization, we used: benzoyl peroxide and benzoin. Benzoyl peroxide and benzoin were dissolved in polyethylene glycol-400 dimethacrylate. Then, oligourethane dimethacrylate, triethylene glycol dimethacrylate ether, pentaerythritol tetraacrylate were added to the resulting solutions and stirred until smooth.

For the formulations obtained, the viscosity was studied using a Brookfield rotary viscometer.

Further, the cured samples were kept for 14 days and the physical and mechanical properties were examined.

Table 2. Physical and mechanical properties of photocurable formulations, based on olygoesteracrylates various buildings.

№	The name of the modifier	The content of the modifier, %			
		0	10	20	30
		Uniform compressive strength δ, MPa			
1	Dimethacrylic triethylene glycol ether	44,41	47,37	90,19	140,96
2	Oligourethandimethacrylate	44,41	48,96	54,62	73,94
3	Tetraacrylate of pentaerythritol	44,41	56,19	71,75	81,98

Table 2 shows that the composition based on polyethylene glycol dimethacrylate modified with triethylene glycol dimethacrylate at a ratio of 70:30 has the greatest strength.

Thus, in this work, we have developed photocurable coatings based on polyethylene glycol dimethacrylate and various cooligomers. It has been established that the highest curing rate and maximum strength are possessed by the compositions modified with triethylene glycol dimethacrylic ether.

References

1. Lin Denga, Liuyan Tangb, Jinqing Qua. Synthesis and photopolymerization of novel UV-curable macrophotoinitiators. Progress in Organic Coatings 141 (2020) 105546.
2. Haoyuan Quan, Ting Zhang, Hang Xu, Shen Luo, Jun Nie, Xiaoqun Zhu. Photo-curing 3D printing technique and its challenges. Bioactive Materials 5 (2020) 110–115.